

## CC1: 'Comment on egosphere-2023-2459', Wim Douven, 14 Dec 2023

Dear Charles and team, I enjoyed reading your manuscript. I find the topic very interesting, and it is good to have another study on serious games. Below some comments, questions, that might be helpful in finalising the manuscript. [I am happy to hear you enjoyed reading the manuscript. Thank you for the positive remarks on the manuscript and constructive suggestions and comments.](#)

**Comment 1:** In the section on IWRM (line 66 and further), you mention that workshops do not promote different experts to engage with wicked problems. But doesn't that depend on how you design such workshops, like how you design serious games...? [Thank you for the question.](#)

**Response:** Yes, we agree that there are many different participatory methods developed especially to promote the engagement of 'local experts'. One of the most familiar is focussed groups, but many others are around including Dramas. Designing serious game sessions may differ from designing workshop sessions. Firstly, serious games are co-designed where both the 'scientists' and 'local experts' are involved in the development of serious games (way before actual game sessions). In the workshop sessions, the scientists' are the most active persons, e.g. when making PowerPoint presentations, explaining an idea, reporting case studies, or simulating a model and its possible results. The participation of 'local experts' is relatively 'passive' in the workshop sessions e.g. sitting and listening to presentations made by scientists. Some workshops may divide participants into small groups for discussions, experimenting, and demonstrating workshop issues. But in most cases, the group discussions tend to have active and less active persons - *in Ln 547 of the manuscript, we have argued this could be due to power differentials among participants...* Workshops often are not the right way to deal with wicked problems.

There is a difference in the game sessions. Serious games provide a 'buffer' to mitigate powerplay and hierarchy, make it more easy for participants to express more freely, since it is 'just' a game. Serious games provide a boundary object commonly not found in workshops. The 'scientists' are less active, and tend to play the passive role of facilitating the process (especially at the start of the game rounds), while participants are the most active persons (in small groups) right from the start to the end of the sessions. The facilitation role tends to decrease as the game progresses, and at some point 'scientists' become the 'observers' of what is happening in the different small groups of gameplay. Scientists tend to learn more this way, as opposed to when they are the main presenters in conventional workshops. The game participants are vigorous as they interact directly with 'virtual systems' such as Board games and also actively engage one another (e.g. disagreeing, setting rules, seeking alternative strategies, etc), the scientists do not control the actual gameplay. *In Ln 542 of the manuscript, we have argued that '.....since each participant in the game has a role to play, they have a stake during the game. They tend to be active in pursuing their stake while focusing on their roles...'*

We agree that if we design workshops similarly to game processes (including having game-like engagements during small group discussions), then designs of workshops and game sessions could both promote different experts to engage in a meaningful way. Still, in most conventional workshops the 'scientists' are the main 'active persons' while 'local experts' are the 'passive' participants. By design game sessions reverse these roles.

**Comment 2:** I note that the lit. review on games is overall very positive on its effects on finding joint solutions etc., are there no limitations and challenges reported in literature? You mention one in your discussion in line 520. Did you come across other limitations, challenges in the sessions? [Thank you for the questions.](#)

**Response:** This study focussed on the literature that has attempted to report on the 'effectiveness of gaming approach'. Hence the purpose of this study was to 'investigate these opinions/claims' by assessing the potential role of serious gaming in strengthening stakeholder engagement. This study contributes to the debate on the 'effectiveness of serious gaming' including how some results contradict past studies see Ln 466-476.

We have highlighted a few limitations in this study (given the focus of the manuscript) in Ln 500 - 521. Definitely, we can probe more about the limitations and challenges of serious games (in other general/specific game settings) and incorporate them in the discussion section (limitations sub-section of this manuscript). Generally, among the limitations/challenges, the most important one is: you cannot play

with people if they are in the mood to fight. So if there already is a conflict, that needs to be dealt with first. Another complication can be that some people have their reservations to engage in a game session if particular other individuals also participate - for instance, bosses with employees, in a hierarchical society.

**Comment 3:** In game conceptualisation (Section 2.2), it might help the reader to give a brief summary about sessions, rounds, and phases, and how they relate to the catchment / sub-catchments. Thank you for the suggestion.

**Response:** During this stage of game conceptualization, there was no playing the games per se, but this is the 'setting stage', which involved bringing all possible ideas to the table, to help in crafting a serious game that fits the context of the case study area. The ideas were gathered from past studies, through the ARDI approach, and conducting community discussions with communities in three sub-catchments. Game testing sessions are described in sub-section 2.3, where feedback was key to help in refining the final game.

**Comment 4:** Data collection (Section 2.4) is there after the step 'modeling the game solution space' not also a step where you collect data about discussion and feed-back, which might result in adjustments of positions and solutions .? As it is an interactive process, it is collecting data and providing data, right? (so feed-back, and giving space for learning)? Thank you for the questions.

**Response:** The data collection description in sub-section 2.4 focussed on data collection based on the final ENGAGE game\_v1 described in Box 1 and Supplement 1. To ensure comparability of data across different game sessions, no further adjustment was made and v1 of the game was maintained (as developed) in the three sub-catchments. Yes, there is a feedback session at the end of playing the games, where participants are allowed to give their feedback and key lessons on the game sessions. The qualitative feedback was useful in crafting some of the reflections included in the discussion section e.g. in Ln 523 ... the *game environment allows for real-time reflection through the creation of a fictional setting and a common pool for the stakeholders to explore decisions and impacts simultaneously'*.....in Ln 542 ..... *'each participant in the game has a role to play, they have a stake during the game. They tend to be active in pursuing their stake while focusing on their roles'*.....

This manuscript focusses on the 'decisions made and qualitative aspects of gameplay' i.e. sentiments raised during the actual gameplay. It is paramount to mention that "*another manuscript (also reporting on 5 additional game sessions)*" focusses on the experiential learning of ENGAGE game\_V1, and how stakeholders' perspectives change before and after game sessions, including the post-game individual interviews with different game participants is about to be submitted.

**Comment 5:** An important discussion point you touch upon is how the game results translate to real life situation (line 560 and further). I wondered was this discussed in the sessions, at the end? How the game was valued, also for real-life? That could already give some initial insights? Thank you for the questions.

**Response:** Yes, a conversation on translating game experience to real-life situations was a key discussion point at the end of the game sessions. There was high positivity on the usefulness of the gaming approach in promoting sustainable behaviors, and all game participants indicated they would adopt a few lessons from the game. The following are some of the direct quotes from some of the game participants:

- *"I need to reduce dependency on the river, I need to construct a small dam"*
- *"I need to manage the land use better, considering the wet and dry seasons. I also need to construct a small dam"*
- *"I need to stop clearing the bushes and forest for agricultural land expansion, I better manage what I already have"*

However, this manuscript recommends further follow-ups to assess the impact of serious games on strengthening stakeholders' engagement and maintaining sustainable behaviors in real life.

Follow-up data collection was done in another study (*"The Manuscript on how stakeholders' perspectives change before and after serious games"*), whereby game participants were traced 5-7 months after the game sessions, and most of these aspects (game experience - real life situation) have been explored.